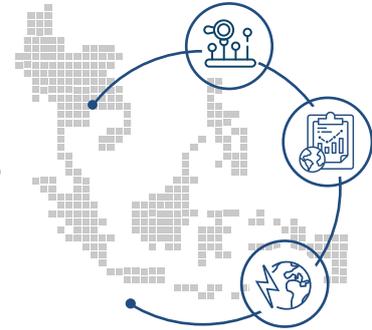




Indonesia's REC Market Assessment and Opportunities for Regional Integration



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Highlights

- **Policy Framework:** Indonesia is developing comprehensive regulations for carbon economic value and renewable energy integration, emphasising market-based mechanisms like carbon pricing, Renewable Portfolio Standards (RPS), and REC's role in both regulatory frameworks.
- **Market Growth:** The Indonesian REC market is rapidly expanding, driven by strong corporate demand and the country's commitment to renewable energy targets. It is characterised by diverse actors, high issuance and consumption volumes, and a variety of REC instruments.
- **Challenges:** The market faces challenges such as ownership disputes, lack of a local issuer, an inadequate legal framework, underutilisation of renewable energy capacity, and limited acceptance of cross-border transactions.
- **Potential for Regional Integration:** Indonesia's abundant renewable energy resources, planned grid interconnections with neighbouring countries, and growing regional demand for clean energy present significant opportunities for REC exports and regional market integration.
- **Recommendations:** To fully realise the potential of its REC market, Indonesia should establish a local issuer, clarify ownership rights, develop a comprehensive legal framework, enhance market transparency and accessibility, encourage broader participation, and actively pursue regional collaboration on REC standards and trade.

1. Introduction

Indonesia has set ambitious renewable energy targets, aiming for a 23% share in its energy mix by 2025 and achieving net-zero emissions by 2060. These goals align with the country's commitment to the Paris Agreement and its broader ambition to transition towards a sustainable energy future. Renewable Energy Certificates (RECs) are emerging as a critical tool in this transition, incentivising renewable energy development and enabling corporations to demonstrate their commitment to sustainability.

This policy brief examines the current landscape of Indonesia's REC market, delving into its strengths, weaknesses, and potential for regional integration. The insights and findings presented here are the result of comprehensive research and stakeholder consultations conducted under the RECAP project, an initiative supported

by the BIMP-Korea Cooperation Fund (BKCF) focused on advancing Renewable Energy Certificate Systems in BIMP-EAGA countries.

2. Indonesia's Energy Transition

2.1. Net Zero Roadmap

Optimising Energy Supply. In reaching the net zero target, Indonesia has outlined a comprehensive energy transition roadmap as illustrated in Figure 1 [1]. The plan focuses on significantly reducing emissions by optimising the energy supply through renewable energy sources like solar, wind, hydro, and biomass. Additionally, the roadmap emphasises managing energy demand by implementing energy efficiency measures across various sectors, including transportation, households, and agriculture.

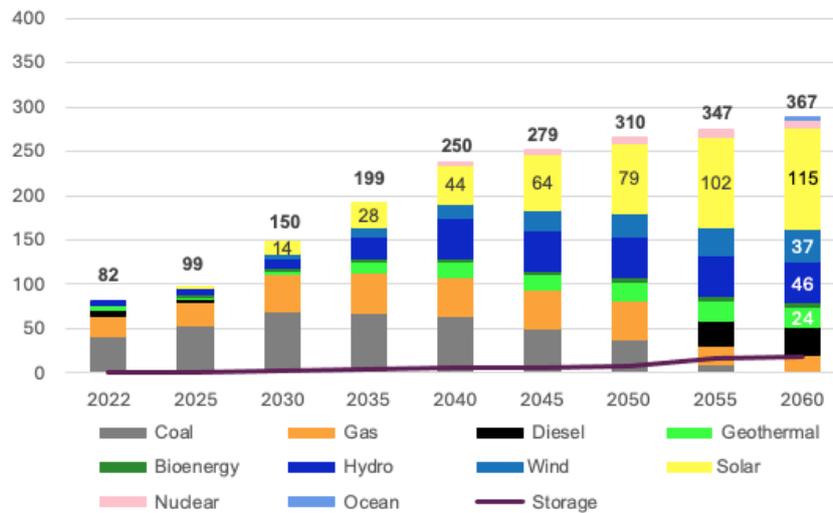


Figure 1. Indonesia Net Zero Roadmap Draft (as of September 2024)

Strategies to Achieve NZE 2060. In the updated draft of Indonesia’s NZE Roadmap for Energy Sector 2060, several strategies will be utilised. These strategies include (1) implementing energy efficiency, (2) developing both on-grid and off-grid renewable energy sources, (3) electrifying various sectors, and (4) phasing out coal-fired power plants. Furthermore, the plan explores the utilisation of carbon capture, storage, and utilisation technologies, as well as the potential of renewable resources like hydrogen and ammonia.

Substantial Financial Investment Need. A significant portion allocated to power generation is needed to achieve the 2060 NZE target. This investment will facilitate the transformation of Indonesia’s energy mix, shifting it away from fossil fuels and towards renewable sources. According to the revision draft of the National Electricity Masterplan, the total power generation capacity is projected to reach 367 GW, primarily driven by solar (115 GW), hydropower (46 GW), and wind (37 GW) by 2060. As of now, the target is still being continuously updated by the Ministry of Energy and Mineral Resources.

2.2. Regulation Landscape for Carbon Economic Value

Carbon Economic Value. Indonesia is actively developing a comprehensive regulatory framework to promote carbon economic value. It emphasises that businesses can gain incentives by actively reducing emissions through renewable energy and energy conservation initiatives. This framework is anchored in Law No. 6 of 2016, which ratifies the Paris Agreement and solidifies Indonesia’s commitment to reducing greenhouse gas emissions.

Market-based Mechanisms to Incentivise Carbon Emission. Building upon this foundation, Government Regulation No. 46 of 2017 introduces environmental economic instruments, paving the way for carbon pricing and other mechanisms. The scope of carbon trading mechanisms is broad, encompassing emissions trading, carbon offsetting, carbon taxation, and other innovative ways that may emerge with advancements in science and technology. MEMR Regulation No. 22 of 2019 further strengthens this framework by providing guidelines for greenhouse gas inventory and mitigation strategies within the energy sector, a major source of emissions.

Carbon Tax and NDC. Law No. 7 of 2021 plays a crucial role by harmonising tax regulations, potentially enabling the implementation of carbon taxation as an additional tool to discourage emissions. Presidential Regulation No. 98 of 2021 establishes the overarching policy framework for carbon economic value, focusing on achieving Indonesia’s Nationally Determined Contributions (NDCs) and controlling greenhouse gas emissions in national development.

Operationalising Carbon Tax and Other Incentives. MEF Regulation No. 21 of 2022 outlines the procedures for implementing the economic value of carbon, providing detailed guidance on carbon pricing mechanisms. MEMR Regulation No. 16 of 2022 further specifies these procedures for the electric power generation subsector, a significant contributor to emissions. Additionally, MEMR Regulation No. 21 of 2022 focuses on incentivising renewable energy generation through rooftop solar power plants, potentially integrating them into the carbon market.

2.3. REC in New and Renewable Energy Law Draft

Renewable Portfolio Standard. Indonesia's government is currently in discussion with the House of Representatives to introduce the New and Renewable Energy Law (RUU Energi Baru dan Terbarukan) [2]. One of the key provisions of the law draft is that businesses involved in electricity generation or holding licences for self-use electricity from non-renewable sources must adhere to the New and Renewable Energy Portfolio Standards (RPS). These standards, aligned with the National Energy Policy, require businesses to integrate a certain percentage of renewable energy into their operations.

Article 44. Besides the mention of RPS, this article also requires businesses to purchase RECs if they fail to meet the RPS targets. This mechanism serves as an incentive for businesses to invest in renewable energy sources, as they can offset their non-compliance by purchasing RECs, which represent electricity generated from renewable sources.

Article 46. While Article 44 establishes the overarching framework for RECs and RPS, Article 46 clarifies that the specifics of implementation, such as the calculation of RPS targets and the trading mechanisms for RECs, will be detailed in a separate Government Regulation. This approach allows for flexibility and adaptability as the renewable energy sector evolves.

2.4. Cross-Border Interconnection Initiatives

High-level Outcome from Indonesia's ASEAN Chairmanship 2023. Indonesia prioritised the adoption of a Joint Declaration at the 41st ASEAN Ministers on Energy Meeting (AMEM) to promote sustainable energy security through interconnectivity. Three key outcomes were launched: (1) a Joint Declaration outlining the commitment of ASEAN member states to enhance energy security through interconnected systems, (2) a Joint Statement detailing a regional power integration project involving Brunei Darussalam, Indonesia, Malaysia, and the Philippines (BIMP-PIP), and (3) a Memorandum of Understanding (MoU) between the power utilities/authorities of these countries to establish a framework for cooperation on technical standards, regulatory frameworks, and power trading arrangements.

Indonesia – Malaysia. Indonesia and Malaysia are collaborating on a cross-border power interconnection project in North Kalimantan. This project involves the construction of 500 kV and 275 kV transmission lines connecting Malinau in Indonesia to Kalabakan in Malaysia.

The 275 kV line is projected to transmit 300-500 MW of electricity from North Kalimantan to Sabah, potentially utilising the Kayan 1 Hydro Powerplant.

Indonesia – Singapore. In September 2023, Indonesia and Singapore signed a MoU on Low-Carbon Energy Development and Cross-Country Electric Power Interconnection. The MoU explores potential interconnection routes, with options under consideration for connecting Pulau Bulan or Batam in Indonesia to Jurong in Singapore. The estimated investment for the required infrastructure is projected to be in the hundreds of millions of US dollars, contingent on the final route selection. Additionally, discussions are underway to determine the ownership of carbon rights associated with the electricity trade between the two nations.

3. REC Potential Contribution to Indonesia's Energy Transition Strategy

Promoting Renewable Energy Development. The REC market incentivises investment in renewable energy projects, as producers can sell RECs to generate additional revenue. This accelerates the expansion of renewable energy capacity and helps Indonesia achieve its renewable energy targets.

Capitalising on Export Opportunities. The growing demand for clean energy in neighbouring countries, coupled with planned grid interconnections, opens up significant export potential for Indonesian RECs. This can drive economic growth and further incentivise renewable energy development within the country.

Supporting National Decarbonization Goals. By enabling companies to offset their carbon footprint, RECs contribute to Indonesia's NDCs under the Paris Agreement and its net-zero emission target by 2060.

Addressing Supply Chain Emissions. The REC market can play a crucial role in reducing Scope 2 emissions in the supply chains of multinational corporations operating in Indonesia. This can help improve the overall sustainability of industries and contribute to broader decarbonisation efforts.

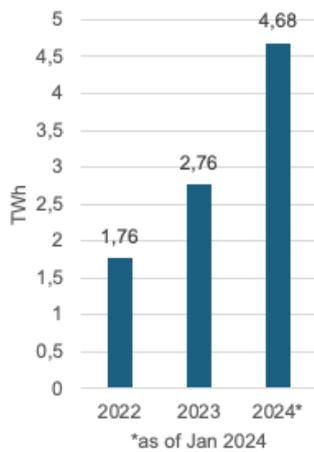
4. Current State of Indonesia's REC Market

Indonesia's REC market is currently experiencing significant growth, driven by increasing corporate demand and the country's commitment to renewable energy targets. The market demonstrates several key characteristics:

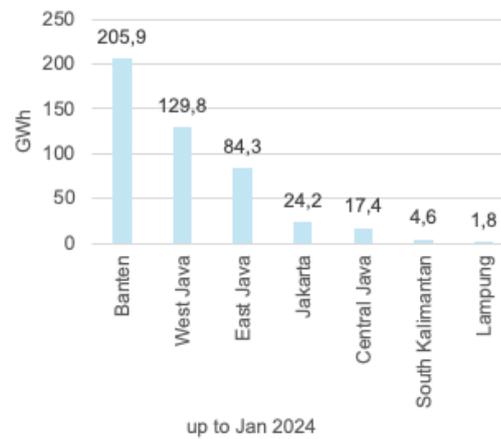
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Robust Market Activity. The market has seen millions of REC transactions annually since its commercial launch in May 2022, indicating substantial interest and engagement from various stakeholders. Figure 2 indicates rapid annual growth,

it even reached 111% YoY, compared to January 2023 sales of 221,506 units. Most REC purchases originated from the Java grid.



(a) Annual REC sale



(b) Origin of REC purchases

Figure 2. PLN's REC sale

Active Participation. A diverse range of actors, including PLN (the national utility), independent power producers (IPPs), brokers, and traders, contribute to a competitive and liquid market.

PLN's Pivotal Role. PLN serves as a major issuer and seller of RECs, particularly bundled products under the TIGRs registry, contributing to the market's growth and development.

Diverse Instrument Availability. Both International REC Standard (I-RECs) and Tradable Instrument for Global Renewables (TIGRs) are traded, offering flexibility for buyers with different preferences.

High Issuance and Consumption Volumes. The market exhibits high volumes of REC issuance and redemption, especially from hydro and geothermal sources, reflecting a strong supply and demand for renewable energy attributes. Table 1 listed six registered power plants with a combined capacity of 1.5 GW. These plants can produce 4.5 TWh of electricity annually.

No.	Name of Power Plant	Technology	Capacity (MW)	Commission Year	Annual Production (GWh)	Location
1	PLTP Ulubelu	Geothermal	110	2012	720	Lampung
2	PLTP Kamojang	Geothermal	140	1987	993	West Java
3	PLTA Cirata	Large Hydro	1,008	1988	1200	West Java
4	PLTM Lambur	Small Hydro	9	2022	30	Central Java
5	PLTA Bakaru	Large Hydro	130	1991	896	South Sulawesi
6	PLTP Lahendong	Geothermal	80	2001	700	North Sulawesi

Table 1. Registered Renewable Power Plant for REC Issuance

Untapped Commercial Potential. Despite the positive indicators, there is room for further growth by encouraging more IPPs and asset owners to register their renewable energy production for REC issuance.

Export Opportunities. The anticipated development of transmission infrastructure to neighbouring countries like Singapore presents significant export opportunities for Indonesian RECs.

5. Key Stakeholders in Indonesia's REC Market

5.1. Government Agencies

Ministry of Energy and Mineral Resources (MEMR): Responsible for policy formulation, oversight, and supervision of electricity and renewable energy projects. Potential candidate for serving as the national oversight body for REC market development.

Directorate General of Electricity (DGE): Under MEMR, it plays a role in electricity sector policy and regulation, including potential involvement in REC issuance.

Directorate General of New Renewable Energy and Energy Conservation (DGNREEC): Also under MEMR, it focuses on renewable energy development and could contribute to REC market design and implementation.

Coordinating Ministry for Maritime and Investment Affairs: Provides input on import and export considerations related to renewable energy and grid infrastructure.

Ministry of Environment and Forestry: Plays a role in reviewing and ensuring alignment between carbon programs and the REC market.

5.2. Market Actors

PLN (State-Owned Utility): A dominant player in the REC market, acting as both an issuer and seller of RECs, particularly bundled products under the TIGRs registry.

IPPs: Key suppliers of RECs, particularly unbundled products registered under the I-REC standard.

International Brokers and Traders: Facilitate REC transactions and connect buyers and sellers in the Indonesian market.

Corporate Buyers: Multinational corporations and domestic companies seeking to meet sustainability targets and offset their carbon footprint.

5.3. International Organisations

I-REC Standard Foundation: Operates the I-REC standard, one of the two main REC registries used in Indonesia.

APX: Operates the TIGR registry, the other major REC registry in Indonesia.

6. Challenges of REC Market Implementation

6.1. Policy and Governance Issues

Lack of Clear Ownership Regulations. Disputes over REC ownership between PLN and IPPs have arisen due to ambiguities in legacy contracts. This lack of clarity has led to market disruptions, including a temporary pause in I-REC issuance, impacting market credibility and buyer confidence.

Absence of a Local Issuer. Indonesia lacks a designated national authority to oversee REC market governance and implementation. This gap can be addressed by empowering a Local Issuer for I-RECs and a Qualified Reporting Entity (QRE) for TIGRs to streamline issuance, revenue generation, and overall market management.

Insufficient Legal Framework. The absence of a comprehensive legal framework aligned with international standards hinders international recognition of Indonesian RECs, limiting their appeal to global buyers and investors.

6.2. Market Development

Underutilisation of Renewable Energy Capacity. Only an estimated 12% of Indonesia's total installed renewable energy capacity is currently registered in REC registries, indicating significant untapped potential for market growth and renewable energy adoption.

Untapped Demand Beyond Corporate Entities. While corporate entities are actively participating in the REC market, there is potential to encourage broader participation from load-bearing entities beyond the corporate level, such as suppliers to multinational brands. This could further drive demand and contribute to national decarbonisation efforts.

6.3. International Recognition and Cross-Border Trade

Limited Acceptance of Cross-Border Transactions. Reporting frameworks like RE100 do not currently recognise cross-border REC transactions in the ASEAN region, limiting the financial value and export potential of Indonesian RECs.

Need for Clear International Agreements. While efforts to extend cross-border interconnections are progressing, establishing agreements with standardised emissions factors and attributes clarifications (carbon emission and REC) are crucial for facilitating cross-border trade and enhancing market credibility.

7. Adopting Global and Regional REC Market Best Practices to Indonesia's Context

7.1. International Best Practices (EU and US)

Private Sector Leadership. Early REC markets are often driven by private sector demand for clean energy, even in the absence of government regulations. This could be relevant to Indonesia if there is a growing corporate interest in sustainability and renewable energy.

Global Guidance. Global systems like RE100 and GHGP provide guidance in the early stages of REC markets. Indonesia could leverage these existing frameworks and best practices as it develops its own REC market.

Clear Contractual Ownership. The importance of clear contract language regarding the ownership of RECs to avoid disputes. This is a crucial lesson that Indonesia could apply to ensure the legal soundness of its REC transactions.

Standardisation. The EU's experience with the European Energy Certificate System (EECS) demonstrates the importance of standardisation for market growth and interoperability. Indonesia could consider developing a similar standardised system for RECs – to streamline the co-existence of two primary issuance methods via I-REC and TIGRs.

Gradual Policy Integration. REC markets can start with voluntary participation and gradually integrate into national policies. This approach could be suitable for Indonesia, allowing the market to develop organically before introducing regulations.

7.2. Regional Experiences (ASEAN and BIMP-EAGA)

Philippines. The Philippines' experience highlights the importance of ensuring that domestic REC design aligns with global voluntary market needs to support exports. A split registry/standards system can pose risks, emphasising the need for compatibility between domestic and international frameworks.

Singapore. Singapore's approach of having a market-neutral issuer who focuses on market facilitation rather than engaging in sales or transactions is presented as a model for Indonesia to consider. This practice ensures the issuer's impartiality and dedication to supporting the market's growth.

Malaysia and Thailand. These countries' experiences highlight the importance of clarifying attribute ownership in power purchase agreements (PPAs). New contracts should explicitly address attribute ownership to avoid ambiguities and potential disputes. It also mentions the practice of using unbundled certificates for attribute trading, which could be relevant to Indonesia's market structure.

8. Growing Indonesia's REC Market

8.1. Governance and Regulatory Improvements)

Establish a Local Issuer and QRE: Appoint an independent entity to manage REC issuance and ensure compliance with international standards, enhancing market credibility and trust.

Clarify Ownership Rights: Resolve ownership disputes between PLN and IPPs by establishing clear guidelines in both legacy and new contracts, aligning with international best practices where IPPs typically retain ownership unless explicitly stated otherwise.

Develop a Comprehensive Legal Framework: Create a unified REC policy that aligns with international standards, clearly defining roles, responsibilities, and trading mechanisms, thus providing a stable foundation for market growth.

8.2. Market Structure Enhancement

Enhance Transparency and Accessibility: Implement a centralised database for REC transactions to serve as a single source of truth, ensuring transparency and preventing double-counting. Utilise data validation tools to maintain data accuracy.

Encourage Greater Participation: Incentivise IPPs and asset owners to register their renewable energy production for REC issuance, tapping into the currently underutilised potential of installed capacity. This can be achieved through streamlined registration processes and financial incentives.

Diversify Demand: Encourage load-bearing entities beyond the corporate level, such as suppliers to multinational brands, to participate in the REC market, thereby expanding the demand base and supporting national decarbonisation efforts.

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9. Opportunities for Regional REC Integration

Export Potential. Indonesia's abundant renewable energy resources, particularly in hydro and geothermal, provide a substantial base for generating RECs. The planned development of transmission infrastructure to connect with neighbouring countries like Singapore, Malaysia, and Brunei creates a significant opportunity for exporting excess renewable energy in the form of RECs. This can generate revenue and attract investment in the renewable energy sector.

Growing Demand in Neighbouring Markets. Demand centres in Singapore and other regional neighbours are seeking clean electricity sources to meet their sustainability goals. Indonesia can leverage this demand to boost its REC market and encourage further development of domestic renewable energy projects.

Regional Collaboration. Active participation in ASEAN initiatives, such as the RECAP project and the working groups established by the I-REC Standard Foundation, can facilitate the harmonisation of REC standards and practices across the region. This can lead to increased cross-border REC trade and market integration.

Addressing International Compliance Mandates. As the Carbon Border Adjustment Mechanism (CBAM) expands to include primary goods like metals, Indonesian exporters will face new tax exposure when exporting to the EU. RECs can be used as a permissible instrument for reducing emissions under CBAM, creating a surge in demand from these critical export industries.

Untapped Potential for REC Issuance. Currently, only a small percentage of Indonesia's installed renewable energy capacity is registered for REC issuance. Encouraging more IPPs and asset owners to participate in the REC market can significantly increase the supply of RECs and meet the growing demand.

Strategic Geographical Location: Indonesia's proximity to regional neighbours with high demand for clean energy, coupled with planned grid interconnections, makes it strategically positioned to become a regional leader in the REC market.

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